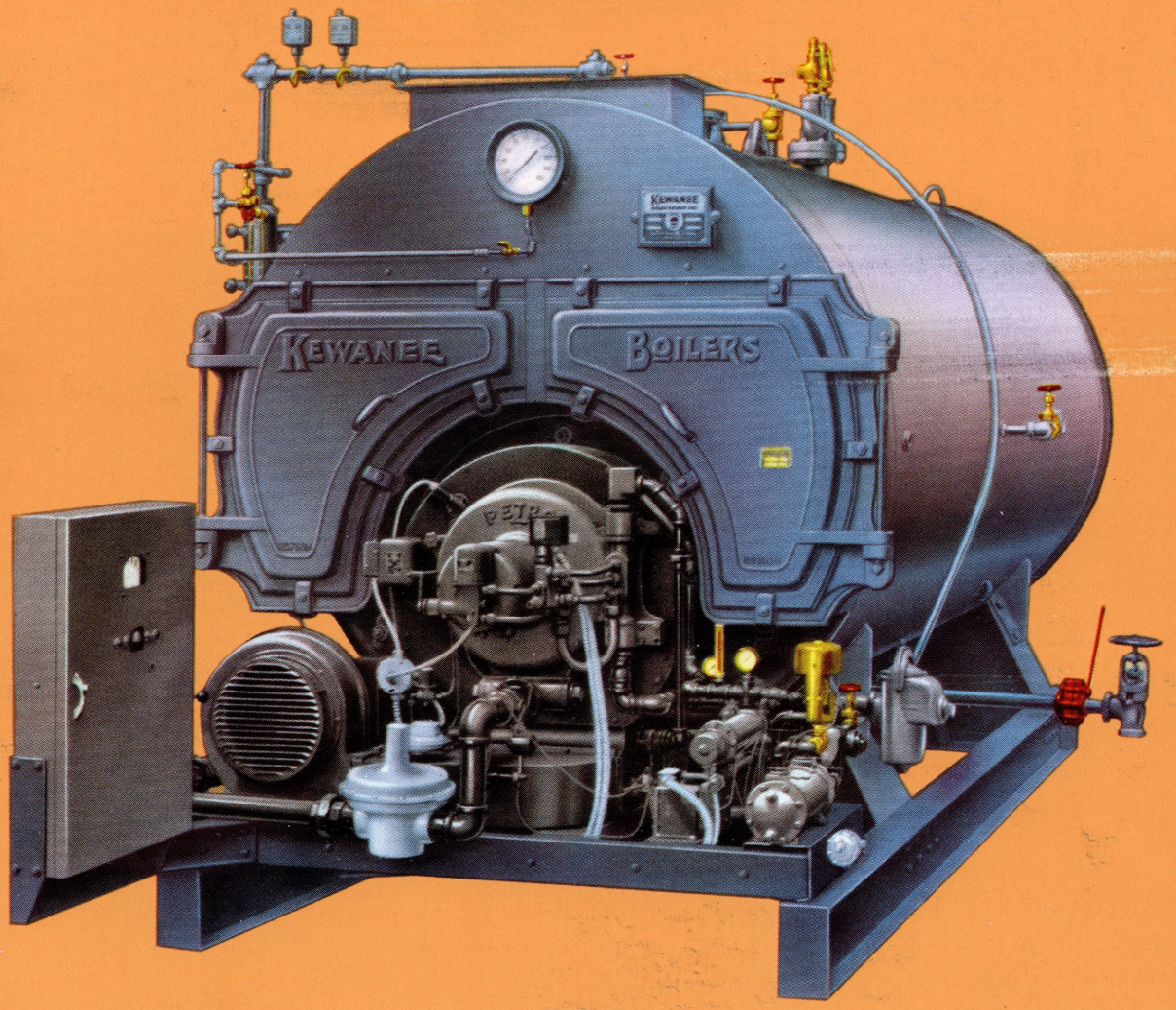
for high or low pressure heating, power and process steam

KEWANEE — PETRO

BOILER BURNER UNIT

A.I.A. FILE NO. 34-B-
(FEB. 1954)



A.I.A. FILE NO. 34-B-1
(FEB. 1954)

oil, gas or oil–gas combination

PETRO, CLEVELAND 11, OHIO ■ KEWANEE-ROSS CORPORATION, KEWANEE, ILLINOIS

Boiler by *Burner by*

KEWANEE — PETRO

A SINGLE MATCHED UNIT.....

for high and low pressure steam and hot water heating

When you bring together the engineering staffs of an outstanding boiler maker and a pioneer manufacturer of oil and gas burners, in the design and engineering of a complete Boiler-Burner Unit—it stands to reason the resulting product is bound to achieve new "highs" in the efficient generation of steam. That, briefly, is the story behind the development of the Kewanee-Petro Boiler-Burner Unit.

Since the days of the first oil or gas firing equipment, Petro has been a recognized leader . . . while the name "Kewanee" has meant the best in boilers for nearly a century.

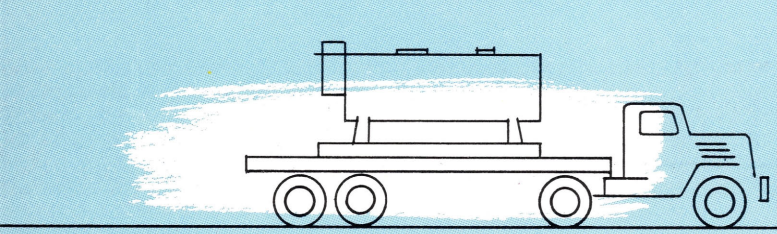
In the new Kewanee-Petro Boiler-Burner Unit these two companies have combined the designing and engineering talents of their staffs to produce a complete unit every part of which is perfectly integrated with all the others. The final result . . . as proved by certified tests . . . is an outstanding unit for the economical and reliable production of high or low pressure steam or hot water.

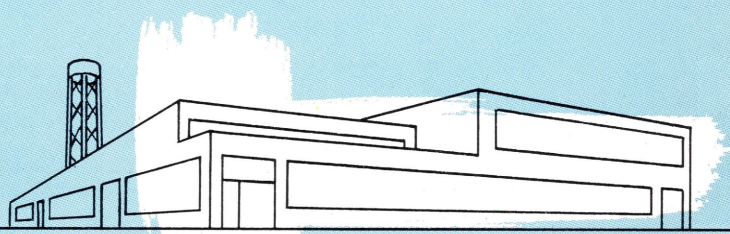
All accessories, not manufactured by Petro or Kewanee, were chosen from the acknowledged leaders in their fields, then tested in the complete unit to be sure that each and every part is a fitting teammate for all the others.

The Kewanee-Petro Boiler-Burner Unit is available in sizes from 39 to 456 hp at 125 and 150 lbs wp . . . and for low pressure use with 15 lbs steam or 30 lbs water in sizes to generate 1,313,000 to 15,300,000 Btu hourly. The units may be fired with No. 6 or lighter fuel oils, gas (either high pressure or as low as 2 oz) or a combination of both fuels.

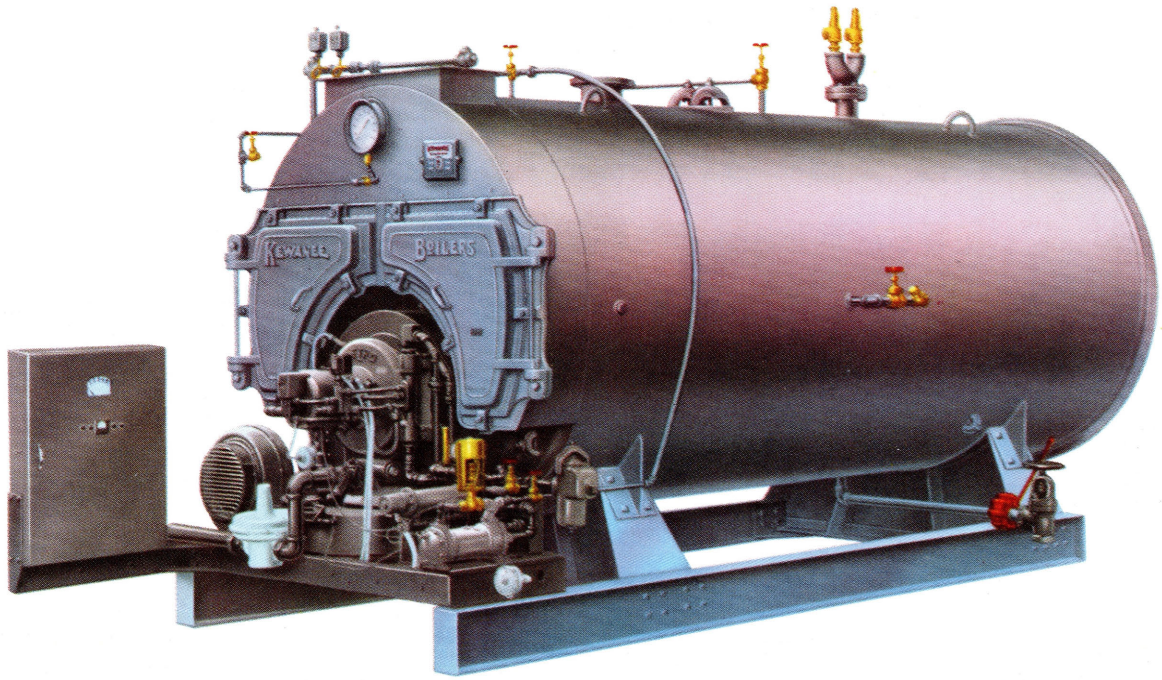
maximum efficiency through entire firing range

The firing rate of the burner is *automatically modulated* in accordance with the load, to maintain a steady steam pressure under all conditions.





Copyright 1953, Kewanee-Ross Corporation



. . carefully engineered, ready to install

boiler and burner designed as a balanced unit by the engineering staffs of two great companies

The Kewanee-Petro Unit generates steam *at top efficiency* whether "loafing" along or when operated at overloads of 50% above its nominal rated capacity.

The boiler, complete with all its trim, arrives on the job mounted on steel skids extended at the front and with matching burner connections for convenient, quick mounting of the burner. No special base construction is required. All refractories are installed at the factory, reducing to a minimum the amount of work required "on the job" to put the unit in service.

With its pressure sealed fire side construction and forced draft burner, the Kewanee-Petro Unit eliminates any necessity for a high stack . . . a vent extending through the roof or outside the building being the only requirement.

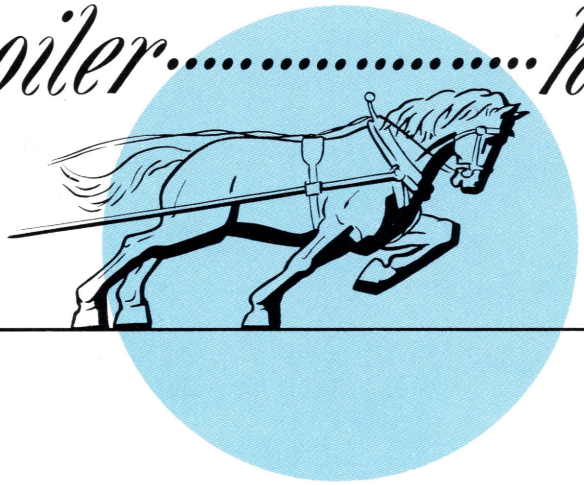
The entire operation of the boiler-burner unit is completely automatic. Only a minimum of time on the part of the boiler room attendant is required.

The boiler . . . complete with steam and water controls, piping and accessories . . . is assembled and shipped from the Kewanee Plant. The burner . . . with built-in forced draft, combustion controls and accessories . . . arrives in a separate shipment from the Petro Factory. This delivery, in two separate shipments, at different times, has proved to be another important advantage.

Because of size, the boiler is usually wanted on the building site before the walls are up. Its construction is such that exposure to weather for a period of time causes no damage. On the other hand, the mechanism of the burner and its controls is more delicate and should not be delivered to the site until the building itself can afford full protection.

Each shipment can be timed to arrive when wanted . . . then the final assembly of boiler and burner can be speedily and easily accomplished at the proper time.

8.2 square feet of heating surface per boiler.....horsepower



Frequently one is asked why Kewanee Boilers operate so efficiently and why that efficiency can be maintained even when they are operated beyond their nominal rated capacity. Let's get down to a few of the basic facts.

In all steam generating equipment two jobs must be done. First, heat must be generated by the burning of fuel . . . second, that heat must be transferred to the water in the boiler. Just how well this transfer action is handled depends entirely upon the amount of heating surface that is built into the boiler. If insufficient heating surface is provided, then naturally more heat will be needed to meet the demand. This results in higher stack temperatures . . . it means longer periods of firing that tend to develop hot spots within the boiler, setting up internal stresses that reduce boiler life. In addition, more cleaning and attention is required to maintain constant efficiency, and the dangers of foaming and priming will be greater where adverse water conditions prevail.

But, by far the most important factor to consider in boilers that use less heating surface is their inability to provide sufficient reserve capacity to adequately handle such common "emergencies" as highly fluctuating peak overloads, expansion in plant operation, severe weather temperature drops, etc.

Only boilers with adequate heating surface safely provide reserve capacity—highest performance efficiency—lowest maintenance cost—dependability—longer life. That's why the Kewanee-Petro Unit has been designed with 8.2 square feet of heating surface for each boiler horsepower of nominal rating . . . a very generous proportion and a concrete example of the fact that Kewanee does put more into every boiler. When selecting a boiler for your job, make sure you compare like data. Use the nominal rating as recommended by Kewanee in sizing your boiler, which assures you the certified reserve capacity which is built into every Kewanee Boiler.

uses of Kewanee-Petro Unit cover wide field

broad range of sizes

In the 13 sizes for both low and high pressure, there is a Kewanee-Petro Unit for practically every power and heating job . . . with ratings ranging from 39 to 456 hp, at 125 and 150 lbs wp . . . or 1,313,000 to 15,300,000 Btu.

choice of fuels

You can specify a Kewanee-Petro Unit with an oil burner, a gas burner, or a dual-fuel burner for either gas or oil, with instant changeover from one fuel to the other.

for heating

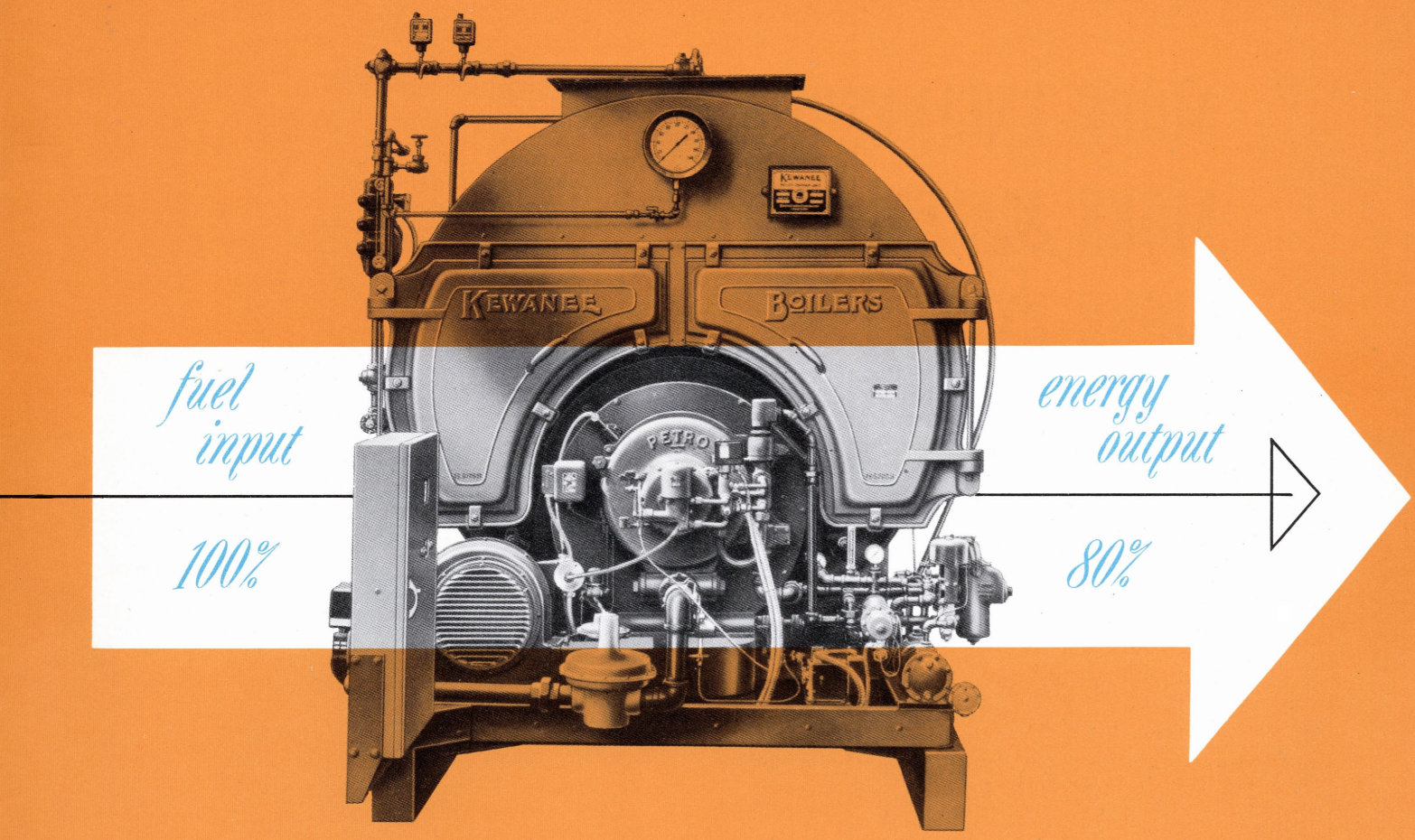
The special advantages of high efficiency, low standby loss and rapid recovery offered by Kewanee-Petro Units, make these units ideally suited for all types of low pressure steam and hot water heating applications.

for processing

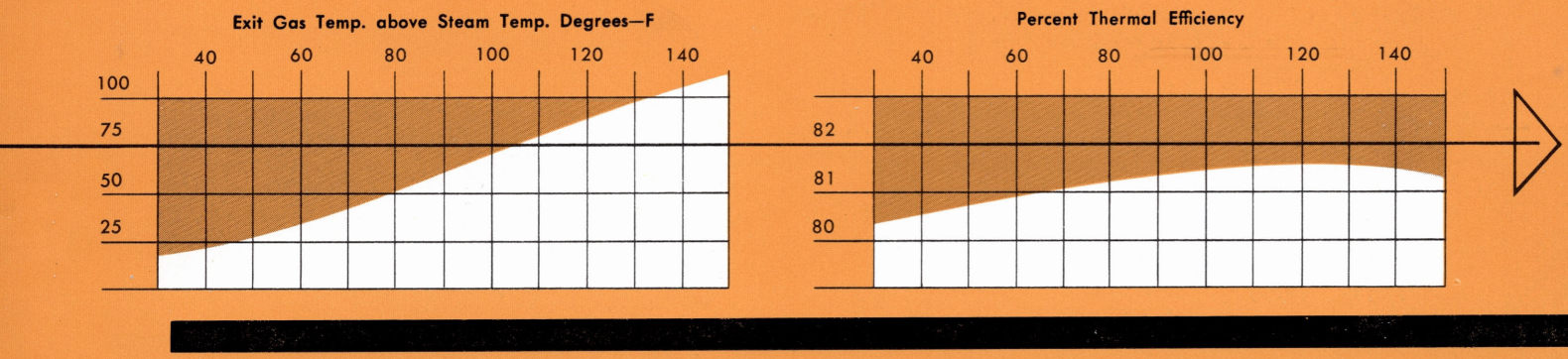
Today . . . in the manufacture of countless products . . . high pressure steam and high temperature water are used for various processing purposes. The Kewanee-Petro Units provide a dependable, economical source that can be counted on day by day, year after year.

for power

Where power is needed and limited floor space or head room is available, the Kewanee-Petro Unit is the ideal answer. Here . . . in a complete, compact package . . . is steam generating equipment which produces new "highs" in efficiencies with lowest maintenance costs.



80% certified efficiency



It's easy to "put your finger" on the over-all efficiency of the Kewanee-Petro Unit. Every gallon of oil or cubic foot of gas which goes into it contains a certain amount of heat. And that much heat is capable of producing a known amount of energy . . . an amount accurately measured by the quantity of water evaporated into steam.

The largest part of the heat generated is absorbed by the boiler. In actual practice this amounts to 80%, which is considered excellent efficiency. The remaining 20% or less is given up by radiation from the boiler, or is vented through the stack.

The chart on the left indicates how efficiently the Kewanee-Petro Unit burns its fuel, without wasting heat up the stack in the form of excess air . . . the percentage of CO_2 (completely burned gases) in the exit chamber tells the story. The chart at the right shows temperature of exit gases, above steam temperatures, and indicates how completely the heat is used.

With the Kewanee-Petro Unit a high over-all efficiency has been proved by many tests and 80% is certified. Actually, under normal on-the-job conditions it is known that higher efficiencies have been attained and retained through the entire firing range of the Unit.

MORE ENGINEERING
MORE MATERIAL
MORE EXPERIENCE

built-in

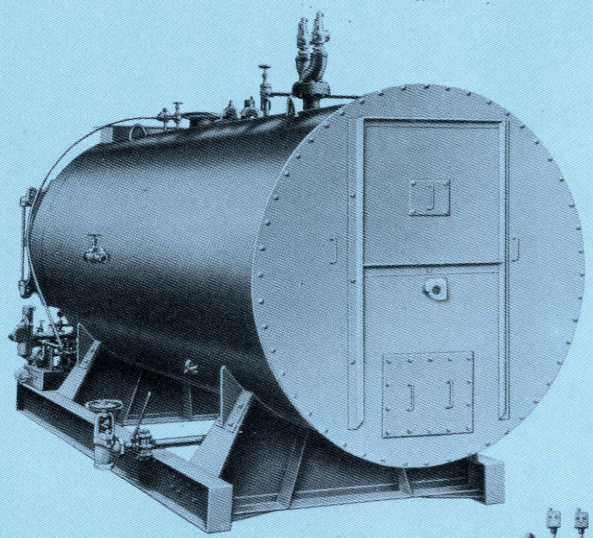
MORE ENGINEERING: From drafting board to finished product the skill and experience of Kewanee engineers has been continuously applied. First in the design and proper proportioning of all parts of the boiler to assure the most steam with the least fuel . . . then in studying each step of construction and fabrication . . . and finally in exhaustive tests to make certain the boiler will perform as intended.

MORE MATERIAL insures extra strength and makes possible a generous sizing of all parts so that every Kewanee Boiler is capable of handling large overloads with full efficiency.

MORE CRAFTSMANSHIP goes into Kewanee Boilers. Notice the carefully welded seams, the fine finish of all cast parts and other evidences of unusual care and good workmanship. Such things require more labor but put extra value into the boilers.

MORE EXPERIENCE . . . more than 85 years of boiler building equips Kewanee engineers and craftsmen with an experience that can't be matched. When a Kewanee goes "on the job" the owner gets all the benefits which only experience such as this can provide.

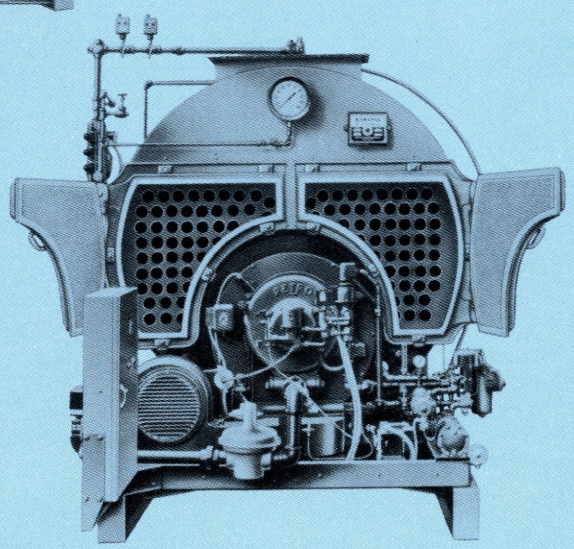
These are the things . . . some of them intangible . . . that make Kewanee Boilers different and better. For other evidences of the quality that is built into every Kewanee, see the large cut-away on pages 8 and 9.



easy to clean and inspect

Every part of the Kewanee Boiler is easily accessible! A manhole on top of the boiler and adequate washout openings give ready access to the waterways. Fire tubes are spaced well apart for free circulation of water and accessibility of water surfaces.

Sturdy hinged doors provide easy access to fire tubes from the front. The entire back cover plate can be removed for access to rear combustion chamber. Or, the rear chamber can be cleaned through the clean-out door without removing the cover plate.



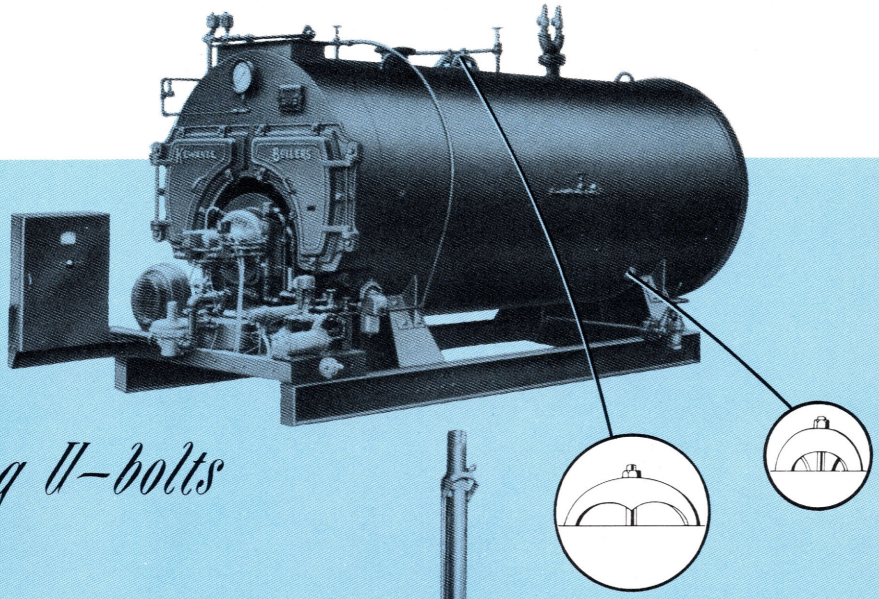
A.S.M.E. code construction

In construction Kewanee Boilers meet or exceed all the rigid code requirements of the American Society of Mechanical Engineers, as well as those of a well known independent boiler inspection and insurance company.

S.B.I. rated

Kewanee-Petro Units are rated in accordance with the provisions of the Steel Boiler Institute Code . . . yet are certified to produce at least 50% more than their rated capacity.

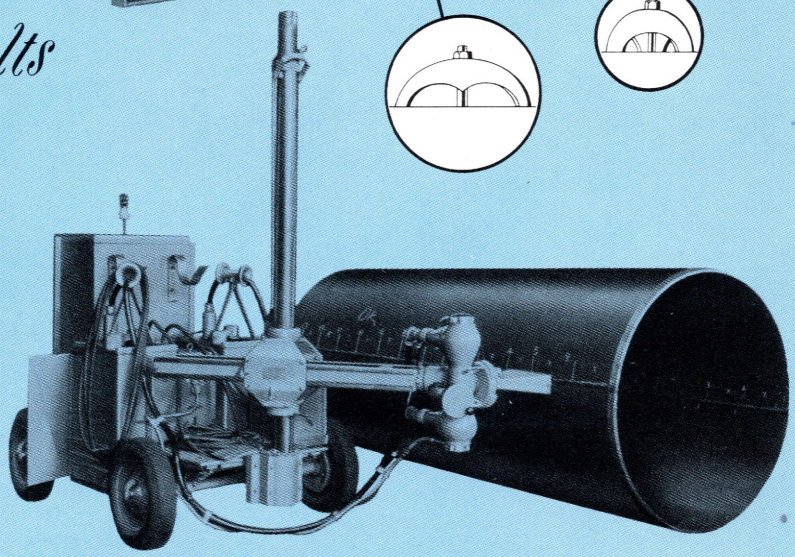
extras in every KEWANEE *boiler*



gas tight flue doors with quick opening U-bolts

Leakage of heat through flue doors, or other openings, results in substantial losses of efficiency.

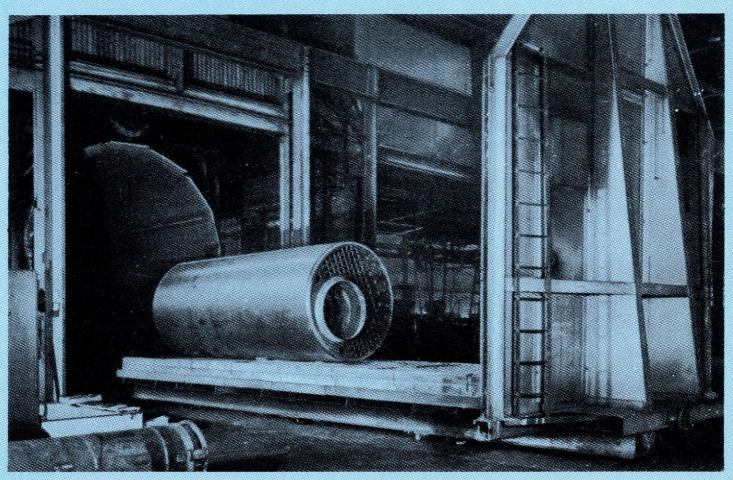
Kewanee Boilers are built with permanent gas-tight doors . . . ground to a precision fit and sealed by a riveted asbestos tape gasket. Place a thin piece of tissue paper in the opening; shut the door, tighten the U-bolts, and it's impossible to pull the paper out without tearing it. Try it sometime yourself . . . you'll find the doors on Kewanee Boilers fit that closely.



no. 1 weld, x-rayed and stress relieved

The dependability of welded joints, in both high and low pressure boilers, has reached new heights. On high pressure boilers a high voltage X-Ray machine radiographs all welds that will be under the full operating load to detect any possible faults, due to gas pockets, faulty fusion or any other causes. Test specimens are "stressed to destruction" to be certain that the strength and ductility of all joints meet rigid specifications.

And in a modern Stress Relieving Furnace, Kewanee Boilers for high pressure are heated to a temperature of 1200° F. then allowed to cool gradually so that the fusion welded joints are thoroughly annealed and any locked up stresses relieved.



HINGED FLUE DOORS held firmly in place with quick opening U-bolts and gasketed for permanent gas tight fit. Provides easy access to tubes for cleaning and inspection.

SHELL—Heavy flange quality steel in both high and low pressure units. Heads and furnace of firebox quality. All welds in accordance with A.S.M.E. Code. 125 and 150 psi units stress relieved.

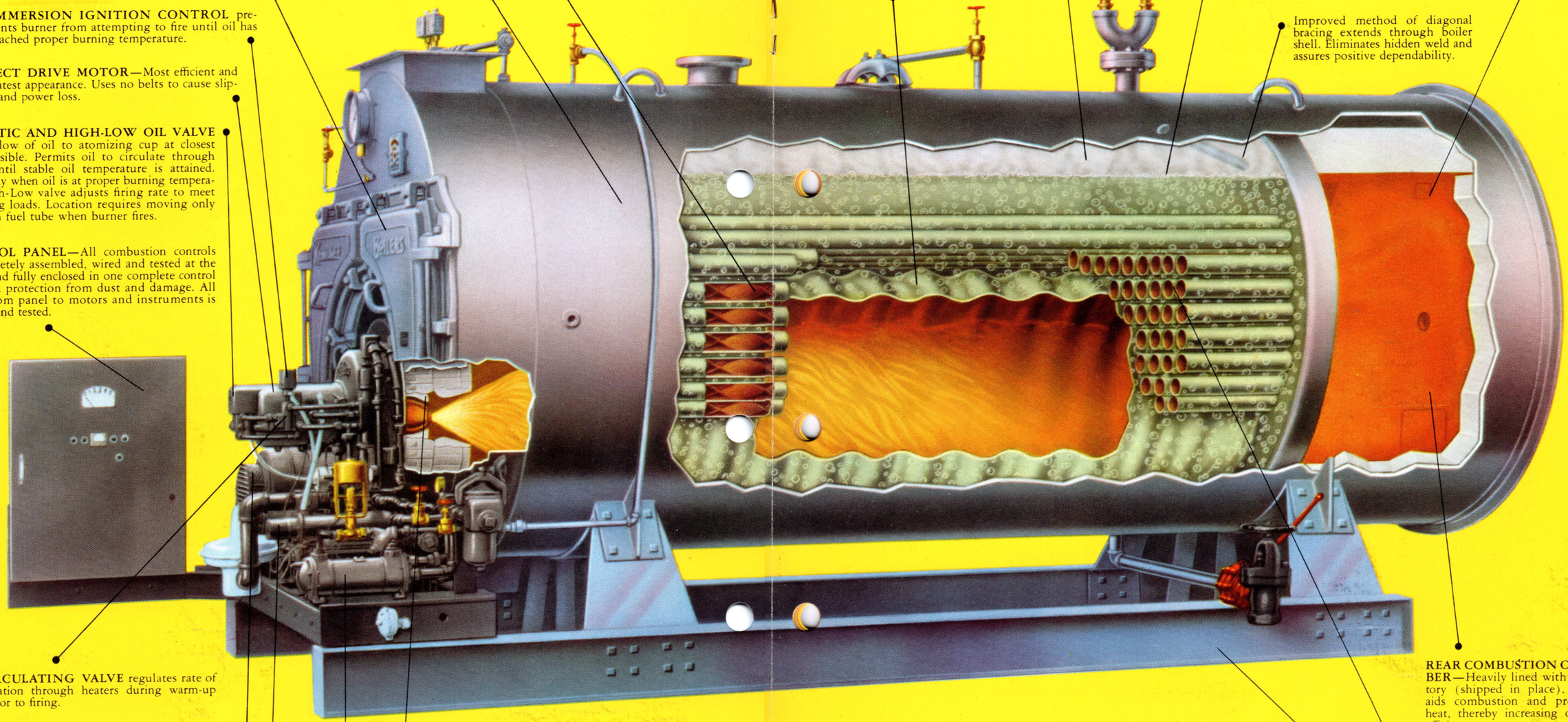
SPINNER BLADES in all tubes swirl the hot gases against tube surfaces providing longer gas travel and assure maximum heat transfer.

IMMERSION IGNITION CONTROL prevents burner from attempting to fire until oil has reached proper burning temperature.

DIRECT DRIVE MOTOR—Most efficient and of neatest appearance. Uses no belts to cause slippage and power loss.

MAGNETIC AND HIGH-LOW OIL VALVE controls flow of oil to atomizing cup at closest point possible. Permits oil to circulate through heaters until stable oil temperature is attained. Opens only when oil is at proper burning temperature. High-Low valve adjusts firing rate to meet fluctuating loads. Location requires moving only cold oil in fuel tube when burner fires.

CONTROL PANEL—All combustion controls are completely assembled, wired and tested at the factory, and fully enclosed in one complete control panel as a protection from dust and damage. All wiring from panel to motors and instruments is installed and tested.



OIL CIRCULATING VALVE regulates rate of oil circulation through heaters during warm-up period prior to firing.

FORCED DRAFT FAN is ruggedly built and is easily accessible for inspection. Direct drive construction and low-speed ball bearing motor assures long, trouble-free service. Fan furnishes a regulated, ample supply of combustion air, eliminating need for a high stack.

FUEL OIL HEATER—Electric Type. Removable, resistance type heater elements provide supplementary source of heated oil for cold starts. Thermostat controls oil temperature and protects heater elements.

VENTURI COMBUSTION THROAT—Refractory-lined combustion throat and chamber. Within it the mixing of the atomized oil or gas with air, and the shape of the flame, are accurately controlled. Adjustable vanes control the rate of rotation of the flame, shaping the flame to match requirements of the fire tube.

FUEL OIL HEATER—Steam or Hot Water Type. A multiple-pass tubular heater with temperature control. Provides principal source of heated oil.

CORRUGATED FURNACE provides extra strength and added heating surface next to the fire in all high pressure boilers. Low pressure units provided with plain furnace tube.

AMPLE STEAM SPACE assures large reserve supply of dry steam.

UNBROKEN DISENGAGING AREA checks turbulence and assures dry steam.

Improved method of diagonal bracing extends through boiler shell. Eliminates hidden weld and assures positive dependability.

Units for high pressure steam incorporate dry back design, with access opening to fusible plug in rear cover plate. Low pressure units, steam and water, designed with water back top.

the integrated

KEWANEE—PETRO

boiler–burner unit

REAR COMBUSTION CHAMBER—Heavily lined with refractory (shipped in place), which aids combustion and preserves heat, thereby increasing over-all efficiency.

FIRE TUBES—3″ diameter heavy gage steel, expanded into holes with ends firmly rolled and beaded.

STURDY STEEL SKIDS simplify handling and installation problems. Requires no special base construction.

Furnace in low pressure boilers is now attached to flanged openings in tube sheet to provide for greater flexibility.

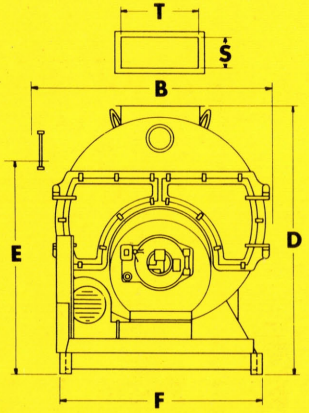
Kewanee–Petro - - - an integrated boiler-burner unit

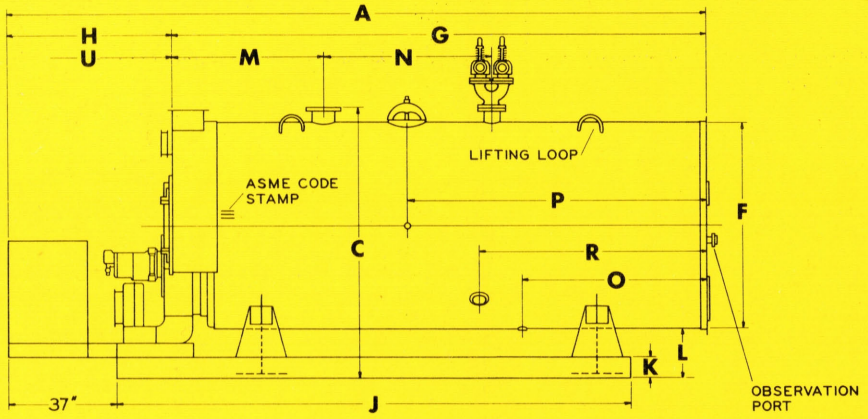
ratings

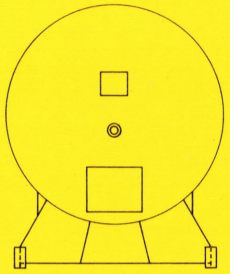
NOTE: When selecting Boiler-Burner Unit sizes, specify (a) Unit Number (last numeral in unit number indicates burner size), (b) Type (steam or hot water), (c) Operating Pressure, (d) Burner Catalog Number, (e) Gas Type and Pressure, (f) Boiler Feed Unit No. for high pressure units (optional).

UNIT NUMBER	KP78–4	KP79–4	KP80–4	KP81–4	KP82–5	KP83–5	KP84–6	KP85–6	KP86–7	KP87–7	KP88–8	KP89–8½	KP90–9
SBI Rating — Horsepower	39	44	52	61	74	87	109	130	152	174	217	261	304
Steam per Hour — 212° F. lb	1350	1500	1800	2100	2560	3010	3750	4510	5260	6010	7510	9010	10510
Btu per Hour 1000's	1313	1459	1750	2040	2479	2916	3643	4373	5100	5830	7286	8743	10200
EDR Steam sq ft	5470	6080	7290	8500	10330	12150	15180	18220	21250	24290	30360	36430	42500
EDR Water sq ft	8750	9720	11660	13600	16520	19440	24280	29150	34000	38860	48570	58280	68000
Certified Output Rating hp	59	66	78	92	111	131	164	195	228	261	326	392	456
Firing Rate — Oil gph*	16	18	22	26	31	37	46	54	64	73	91	110	127
Gas Btu/hr 1000's	2460	2740	3280	3830	4650	5460	6840	8200	9560	10920	13670	16400	19120
Heating Surface sq ft	322	358	429	500	608	715	893	1072	1250	1429	1786	2143	2500
Furnace Volume cu ft	45.8	48.4	57.9	62.4	79.8	87.5	110.2	141.1	153.7	174.0	217.0	262.9	308.8

*Fuel burning rates based on 150,000 Btu oil.







dimensions (feet–inches)

UNIT NUMBER	KP78–4	KP79–4	KP80–4	KP81–4	KP82–5	KP83–5	KP84–6	KP85–6	KP86–7	KP87–7	KP88–8	KP89–8½	KP90–9
A — Length Overall	16–2½	17–1½	16–0½	17–3	17–6½	19–2½	20–8	21–1½	23–1½	22–3	24–9	25–9½	25–9½
B — Width Overall	5–8	5–8	6–2	6–2	6–8	6–8	7–4	7–10	7–10	8–4	8–10	9–6	10–0
C — Steam Supply Height	6–6½	6–6½	7–0	7–0	7–6½	7–6½	8–1	8–7	8–7	9–1½	9–8	10–4½	10–10½
D — Smoke Outlet Height	6–4½	6–4½	6–10	6–10	7–4	7–4	7–10½	8–4½	8–4½	8–11	9–4½	10–1	10–7
E — Water Line Height	5–3½	5–3½	5–8	5–8	5–11½	5–11½	6–4	6–8	6–8	7–0½	7–5½	8–0½	8–6
F — Boiler Diameter — Base Width	4–6	4–6	5–0	5–0	5–6	5–6	6–0	6–6	6–6	7–0	7–6	8–0	8–6
G — Boiler Length	11–8	12–7	11–7	12–9½	13–2	14–10	16–1	16–7	18–7	17–9	18–11	20–0	20–1
H — Front of Unit to Boiler	4–6½	4–6½	4–5½	4–5½	4–4½	4–4½	4–7	4–6½	4–6½	4–6	5–10	5–9½	5–8½
J — Base — Length	11–7½	12–6½	11–5½	12–8	12–9½	14–5½	15–9	15–9½	17–9½	16–10	19–2	20–2½	20–2½
K — Height	0–6	0–6	0–6	0–6	0–8	0–8	0–8	0–10	0–10	1–0	1–0	1–0	1–3
L — Floor to Boiler	1–6½	1–6½	1–6	1–6	1–6	1–6	1–6½	1–6½	1–6½	1–7	1–6½	1–9	1–9
M — Steam Supply	3–0	3–6	3–1	3–7	3–8	4–2	4–9	4–10	5–4	5–5	5–5	5–6	5–7
N — Safety Valve	3–6	4–3	4–3	4–4	4–5	5–0	5–0	5–0	6–6	5–6	6–6	7–0	7–0
O — Blow-off	4–0	4–0	4–0	4–0	4–3	4–3	4–5	5–4	5–4	5–6	5–6	5–6	5–6
P — Feed Water, each side	6–7	7–1	6–6	7–1	7–4	8–2	8–10	9–3	10–3	9–10	10–6	11–0	11–0
R — Return 15 lb swp, each side	4–4	4–4	4–4	4–4	4–9	4–9	5–3	5–8	6–2	6–3	6–5	6–7	6–7
S — Smoke Outlet — Width	0–10	0–10	0–10	0–10	0–10	0–10	0–11	1–1	1–1	1–2	1–2	1–4	1–6
T — Length	1–4	1–4	1–8	1–8	2–4	2–4	2–4	2–8	2–8	2–8	3–2	3–2	3–4
U — Tube Replacement Space	7–2	8–1	6–11	8–1½	8–2	9–10	10–9	10–8	12–8	11–7	12–7	13–6	13–5

data

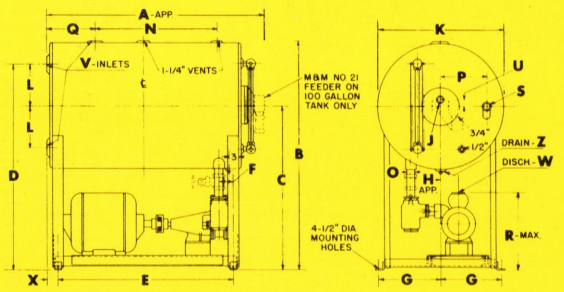
Vent Diameter	1–2	1–2	1–3	1–4	1–5	1–7	1–8	1–10	1–11	2–0	2–2	2–4	2–6
Safety Valve Capacity													
— over 15 lb swp....lb steam per hr	2576	2864	3432	4000	4864	5720	7144	8576	10000	11432	14288	17144	20000
— 15 lb swp....lb steam per hr	1610	1790	2145	2500	3040	3575	4465	5360	6250	7145	8930	10715	12500
Steam Supply Size — 15 lb swp**	0–6	0–6	0–8	0–8	0–8	0–8	0–8	0–8	0–8	0–8	0–10	0–10	0–10
over 15 lb swp***	0–4	0–4	0–4	0–4	0–6	0–6	0–6	0–6	0–6	0–6	0–8	0–8	0–8
Blow-off Size	0–1½	0–1½	0–2	0–2	0–2	0–2	0–2	0–2	0–2½	0–2½	0–2½	0–2½	0–2½
Return Size	0–4	0–4	0–4	0–4	0–4	0–4	0–4	0–4	0–4	0–4	**0–6	**0–6	**0–6
Outside Surface to Cover....sq ft	165	180	180	200	230	260	305	340	380	390	440	500	530
Approx. Weight — 15 lb swp	9500	9900	10800	11500	14100	15400	18200	21200	23600	27200	32100	37900	42300
125 lb swp	10100	10500	12700	13800	15900	16900	20900	24700	26300	31900	37500	43800	49200
150 lb swp	10700	11200	13000	14200	16700	18100	22100	26500	29300	33500	40000	46700	52400
Boiler Feed Unit Number....125 swp	KXE–10	KXE–12	KXF–11	KXF–11	KXF–12	KXF–12	KXG–20	KXG–8	KXH–20	KXH–22	KXJ–20	KXJ–20	KXK–20
GPM — Maximum 195° F	7.9	8.9	10.5	12.6	15.4	18.2	22.4	27.3	32.2	36.4	45.5	54.6	63.0
Pump Number	1130	1131	1133	1133	1141	1141	1252	1255	1255	1255	2257	2257	2283
Motor Size....hp–RPM	2–3450	3–3450	3–3450	3–3500	3–3500	3–3500	5–3500	7½–3500	7½–3500	10–3500	10–3500	10–3500	15–3500
Tank Capacity....gal	60	60	100	100	100	100	200	200	250	250	350	350	500
Shipping Weight....lb	550	600	650	650	650	650	850	900	1050	1150	1400	1400	1650
Boiler Feed Unit Number....150 swp	KXE–12	KXE–12	KXF–11	KXF–21	KXF–22	KXF–22	KXG–20	KXG–21	KXH–21	KXH–21	KXJ–20	KXJ–21	KXK–21
GPM — Maximum 195° F	7.9	8.9	10.5	12.6	15.4	18.2	22.4	27.3	32.2	36.4	45.5	54.6	63.0
Pump Number	1131	1131	1133	1251	1252	1252	1252	2255	2255	2255	2257	2279	2282
Motor Size....hp–RPM	3–3450	3–3450	3–3450	5–3500	5–3500	5–3500	5–3500	10–3500	10–3500	10–3500	10–3500	15–3500	20–3500
Tank Capacity....gal	60	60	100	100	100	100	200	200	250	250	350	350	500
Shipping Weight....lb	600	600	650	750	650	650	850	1050	1200	1200	1400	1550	1700

**150 lb American Standard Flange. ***300 lb American Standard Flange.

BOILER FEED UNITS

dimensions–inches

PUMP SIZE	W
1130–1133	1
1143–1148	1¼
1251–1253	1¼
1255–1259	2
2255–2257	2
2279–2283	2



UNIT	A	B	C	D	E	F	G	H	J	K	L	N	O	P	Q	R	S	U	V	X	Z
KXE	42	60	47¾	55½	33	3⅝	11¼	3½	¾	22½	7¾	23	1½	..	9½	14¾	..	1½	2½	2½	1
KXF	46	78	63½	73¾	36	4½	14	5	..	27	10¼	28	1½	..	9	18¼	..	..	3	3	1¼
KXG	66½	78	62	73	56	4½	14⅜	5½	..	30	11	48	2	12	9	19¼	¾	..	4	3¼	1½
KXH	66½	78	60	74½	56	4½	17½	7¼	..	36	14½	48	2	15	9	20⅛	¾	..	4	3¼	1½
KXJ	66½	78	56	73	56	6	20¼	8	..	42	17	48	2½	15	9	21⅝	¾	..	4	3¼	1½
KXK	90½	78	56	73	78	6	20¼	8	..	42	17	72	2½	15	9	18¾	1	..	4	4	1½

STANDARD EQUIPMENT (125 and 150 lb STEAM) — Pressure controls, safety valve, pump control and low water cut-off, blow-off valve and piping, water column with water-gage glass and three gage cocks, steam gage and cock, injector, piping and fittings for attaching trimmings to boiler. See separate specification sheets for burner equipment.

STANDARD EQUIPMENT (30 lb WATER) — Pressure gage, thermometer, water temperature control, water relief valve, low water cut-off, piping and fittings for attaching trimmings to boiler. See separate specification sheets for burner equipment.

STANDARD EQUIPMENT (15 lb STEAM) — Pressure controls, steam gage and cock, low water cut-off, safety valve(s), water column with water-gage glass and three gage cocks, piping and fittings for attaching trimmings to boiler. See separate specification sheets for burner equipment.

SAFETY VALVES — Boilers over 15 lb swp — Number and size varies with valve setting. All boilers having 500 sq ft or less of heating surface furnished with one valve. Boilers having more than 500 sq ft of heating surface furnished with two or more valves. Manufacturer reserves right to use separate outlets or yokes as conditions require.
Boilers 15 lb swp — One or more valves furnished depending on required capacity.

OIL BURNERS — Model and Catalog Numbers

CAPACITY GPH	Full Automatic Operation with Nos. 2 and 4 and Unheated No. 5 Oil		Full Automatic Operation with Preheated No. 5 Oil		Full Automatic Operation with No. 6 Oil	
	Model No.	Catalog No.	Model No.	Catalog No.	Model No.	Catalog No.
25	FW–4A	51801	FW–4AE	51808	FW–4AH	51815
35	FW–5A	51802	FW–5AE	51809	FW–5AH	51816
50	FW–6A	51803	FW–6AE	51810	FW–6AH	51817
70	FW–7A	51804	FW–7AE	51811	FW–7AH	51818
100	FW–8A	51805	FW–8AE	51812	FW–8AH	51819
120	FW–8½A	51806	.....	.....	FW–8½AH	51820
145	FW–9A	51807	.....	.....	FW–9AH	51821

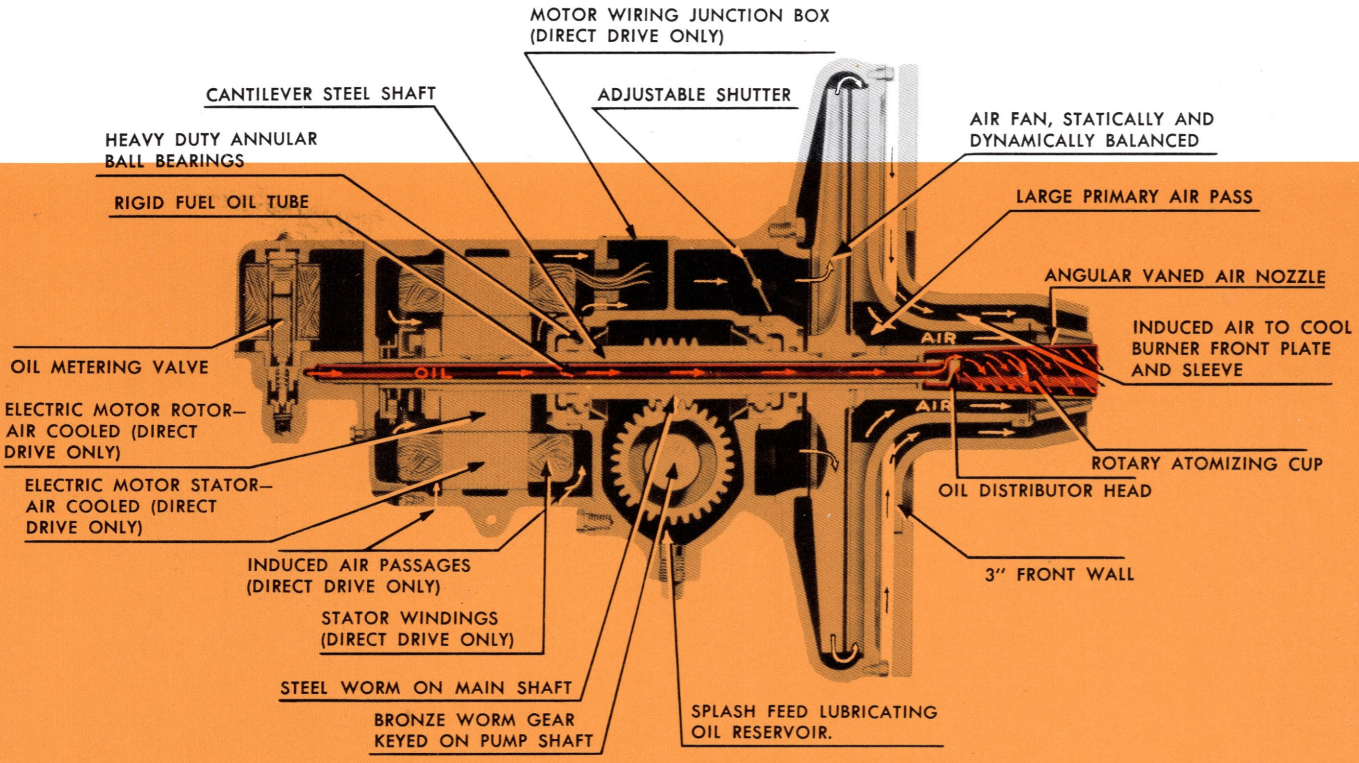
GAS BURNERS — Model and Catalog Numbers

INPUT 1000'S BTU PER HOUR	AUTOMATIC START		MANUAL START	
	Model No.	Catalog No.	Model No.	Catalog No.
3750	FG–4A	61722	FG–4M	61729
5250	FG–5A	61723	FG–5M	61730
7500	FG–6A	61724	FG–6M	61731
10500	FG–7A	61725	FG–7M	61732
15000	FG–8A	61726	FG–8M	61733
18000	FG–8½A	61727	FG–8½M	61734
21750	FG–9A	61728	FG–9M	61735

COMBINATION OIL AND GAS BURNERS — Model and Catalog Numbers

OIL CAPACITY GPH	GAS INPUT PER HOUR 1000'S BTU	Full Automatic Operation with Nos. 2 & 4 & Unheated No. 5 Oil		Full Automatic Operation with Preheated No. 5 Oil		Full Automatic Operation with No. 6 Oil	
		Model No.	Cat. No.	Model No.	Cat. No.	Model No.	Cat. No.
25	3750	FGW–4A	61701	FGW–4AE	61708	FGW–4AH	61715
35	5250	FGW–5A	61702	FGW–5AE	61709	FGW–5AH	61716
50	7500	FGW–6A	61703	FGW–6AE	61710	FGW–6AH	61717
70	10500	FGW–7A	61704	FGW–7AE	61711	FGW–7AH	61718
100	15000	FGW–8A	61705	FGW–8AE	61712	FGW–8AH	61719
120	18000	FGW–8½A	61706	.....	.....	FGW–8½AH	61720
145	21750	FGW–9A	61707	.....	.....	FGW–9AH	61721

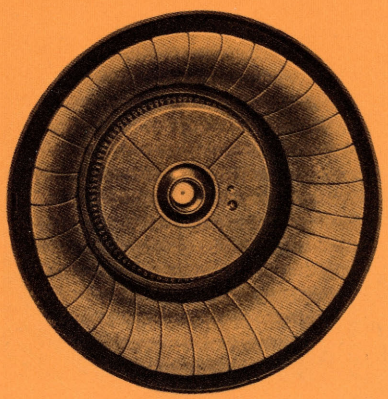
the PETRO *firing unit.....*


MOTOR WIRING JUNCTION BOX (DIRECT DRIVE ONLY)
CANTILEVER STEEL SHAFT
ADJUSTABLE SHUTTER
AIR FAN, STATICALLY AND DYNAMICALLY BALANCED
HEAVY DUTY ANNULAR BALL BEARINGS
RIGID FUEL OIL TUBE
LARGE PRIMARY AIR PASS
ANGULAR VANED AIR NOZZLE
INDUCED AIR TO COOL BURNER FRONT PLATE AND SLEEVE
OIL METERING VALVE
OIL
AIR
AIR
ELECTRIC MOTOR ROTOR— AIR COOLED (DIRECT DRIVE ONLY)
ROTARY ATOMIZING CUP
OIL DISTRIBUTOR HEAD
ELECTRIC MOTOR STATOR— AIR COOLED (DIRECT DRIVE ONLY)
3" FRONT WALL
INDUCED AIR PASSAGES (DIRECT DRIVE ONLY)
STATOR WINDINGS (DIRECT DRIVE ONLY)
STEEL WORM ON MAIN SHAFT
BRONZE WORM GEAR KEYED ON PUMP SHAFT
SPLASH FEED LUBRICATING OIL RESERVOIR.

for all grades of oil

The heart of the firing system is the Petro Model W horizontal rotary oil burner, which is adaptable to the whole range of fuel oil grades. It is a rotary cup type burner of proved superiority. Its simplicity of design and assembly tells the mechanically informed that many years of patient development were required to achieve this compact and efficient burner.

The operating efficiency of any burner, however well developed or built, depends on its proper application to the boiler. Ordinarily this vital work has to be done on the job when the burner is installed. But in the Kewanee-Petro Unit you get a perfectly balanced assembly in which boiler, burner, forced draft air supply and control system have been completely integrated and thoroughly engineered in advance by the engineering staffs of two great companies. Application consists merely of attaching the burner to the boiler.



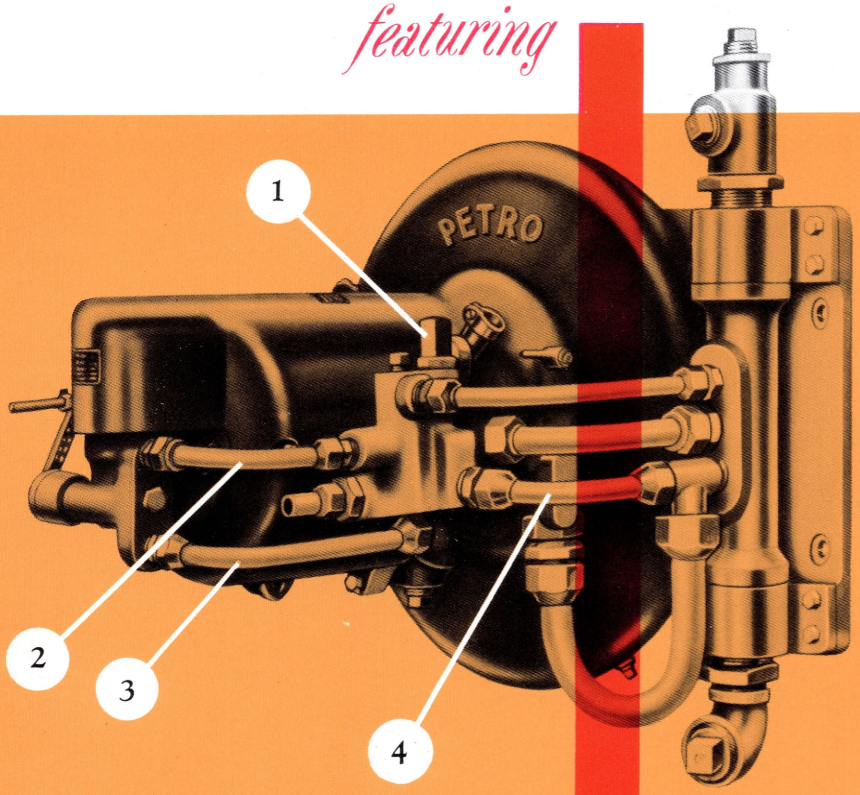
for gas and gas–oil

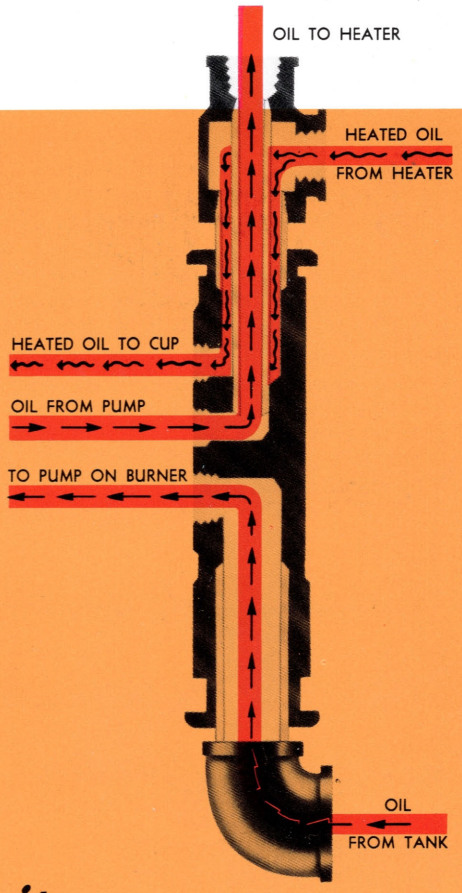
The Petro gas burner is a highly efficient ring-type burner which is most effective for firing Scotch type boilers. Circular arrangement of the multiple gas jets provides thorough mixing of gas and air in the burner throat ahead of the combustion zone. A simple and ingenious system of air vanes at the throat entrance regulates the air volume and distribution and the rate of flame rotation in the furnace tube. This burner is designed for use with all types of fuel gas, high or low pressure.

The gas-oil model is a combination of the two burners described above in which the oil burner is located at the center of the gas ring. Both burners are always available for use and the change from one fuel to the other takes just the few minutes needed to open and close appropriate valves and switches. The boiler operates at top efficiency with either fuel.

.....oil, gas or oil–gas combination

featuring





exclusive Petro Thermal Viscosity principle

When heavy oil is to be burned in the Kewanee-Petro Unit the burner is equipped with the Petro Thermal Viscosity System. This system, exclusive with Petro, assures a uniform flow of oil to the atomizing cup at all times despite the natural tendency of heavy oil to flow more freely when hot than when cold. It utilizes the principle that at constant pressure a liquid will flow through an orifice of fixed size at a constant rate if its viscosity remains constant.

In the Petro Thermal Viscosity System the necessary constant pressure is provided by the fuel oil pump and a pressure relief valve. The required orifice of fixed size is provided by a manually adjustable valve that is set at the desired firing rate. Constant viscosity is provided by heating the oil to a suitable temperature and keeping it at this temperature constantly.

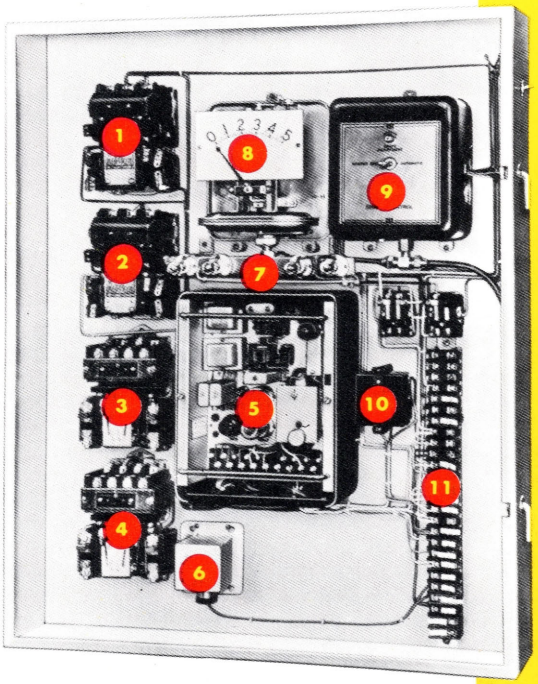
At temperatures in the range of 170°-180° F. heavy oils are almost as fluid as kerosene or water. Some are more fluid than others, but at these temperatures they tend to approach a common viscosity. With all of them, temperature and viscosity move together. Viscosity going down as temperature goes up, and viscosity remaining constant if temperature remains constant. The Petro Thermal Viscosity System includes the necessary heaters and controls to heat the oil to the required temperature. It holds the temperature constant, and prevents the burner from firing until the oil is at the proper temperature.

In the photograph above the large U-shaped tubing from the lowest hinge connection supplies oil to the pump which is mounted above the left side of the "U". Oil pressure in the burner circuit is controlled at "1" from where the oil is carried by "2" to the magnetic valve. If the oil is at the correct temperature for burning, it is fed to the atomizing cup by the magnetic valve. But if the oil is not at the correct temperature, it is returned through tube "3" to be recirculated and further heated. Tube "4" is a recirculating by-pass which provides for recirculation of the fuel oil while it is being heated to the proper burning temperature.

automatic controls

each panel is designed for the individual job

This heavy duty, totally enclosed control panel is assembled, wired and tested at the factory, and each panel is designed for the particular type of control system required for the individual job. It is the center of the operating control system, which automatically proportions the supply of oil and air to suit load conditions, and of the safety control system, which stops the burner instantly in case of low water, excessive pressure or temperature, or ignition or flame failure. It reduces to a minimum problems of field application and adjustment.



for all types of conventional or special application: automatic or semi-automatic

The automatic control center is in keeping with the trim compactness of the Kewanee-Petro Unit. Here, housed in a sturdy steel cabinet with a hinged, gasketed door are the major elements of the automatic control system. No longer is it necessary to find boiler room wall space on which to mount these sensitive devices on a makeshift panel board.

The control center, wired to sensing elements and actuators on the burner and boiler, automatically maintains the desired steam pressure or water temperature and the proper water level in steam boilers. Through its electronic scanner, it permits the burner to start only if proper ignition is assured, and stops the burner if for any reason the flame is extinguished. It stops the burner in the event of its own failure and lights a telltale lamp to show that failure has occurred.

Safety, the most important factor in the automatic firing of boilers, is assured against all abnormal operating conditions. Proper water level is maintained by a pump control which adds water as needed and stops the burner instantly if the water drops to an unsafe level. A modulating control regulates the supply of oil and air to maintain the desired steam pressure or water temperature under fluctuating load conditions. Should the pressure or temperature rise even with the burner firing at its lowest rate a separate high limit control stops the burner.

Combustion controls supervise every burner operation. On starting they turn on the main flame only if there is satisfactory pilot flame. They stop burner if main flame fails to ignite or if, once lighted properly, it is extinguished. A signal lamp, visible at all times, lights when a safety shutdown occurs. Other lamps light to show various steps in operating sequence.

Magnetic starters with overload current protection start and stop all motors in response to control demands. Starters are provided for 1 Burner motor; 2 Forced draft fan motor; 3 Feed water pump (optional); 4 Auxiliary oil circulating pump (optional).

5 Electronic combustion control shuts down burner instantly in event of flame failure—includes cycling controls for starting combustion equipment in proper sequence.

6 Low voltage power type transformer—supplies electric current to burner input modulating controls.

7 Indicating signal lights working in conjunction with indicating meter on panel door, show the operator at a glance status of burner operating cycle.

8 Gage indicates pressure or draft existing within the boiler furnace.

9 Automatic draft control (optional) recommended on boilers connected to stack high enough to create draft at boiler outlet. Not needed with "stub stack" unless atmospheric pressure varies in boiler room.

10 Gas-Oil transfer switch—used on dual-fuel burners.

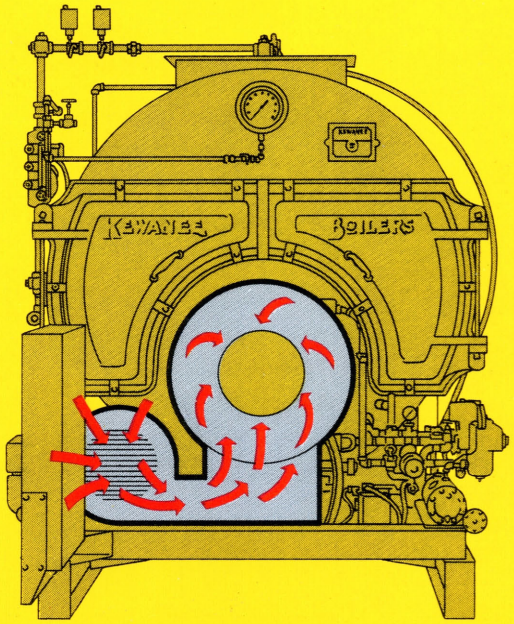
11 Terminal strip — factory wired to panel instruments and to burner components.

12 Door gasket — resilient rubber seal.

13 Panel door—heavy hinged type with self-locking latch. Protects controls and wiring from damage.

14 Control circuit voltmeter —gives constant indication of electronic control circuit. Provides check on condition of vacuum tubes.

forced draft makes high stacks unnecessary

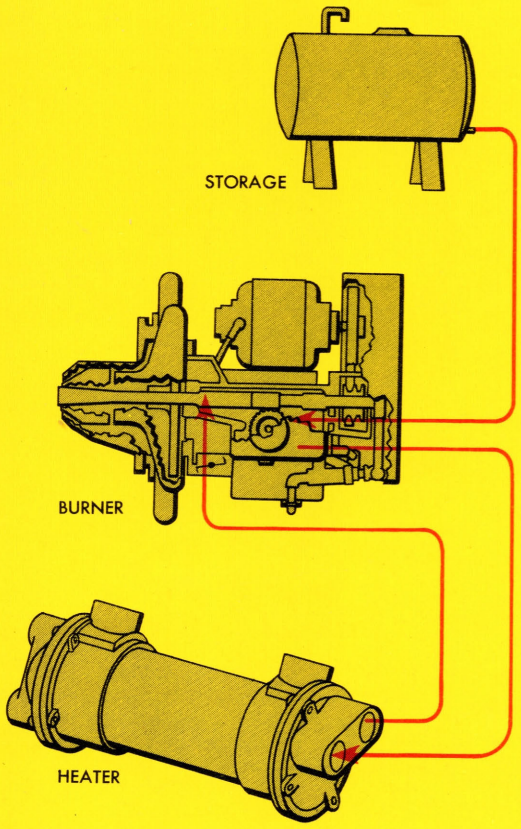


The only flue connection required for this unit is a vent pipe to convey the spent products of combustion outside the building. This important feature eliminates a major expense item.

The integral forced draft blower furnishes a regulated supply of combustion air to the burner with sufficient pressure to force it through the boiler passages at all ratings. Proper ratio of air to fuel is maintained by the automatic control system which continuously meters the secondary air volume at the inlet to the burner throat. This superior type of air control not only gives precise control of air volume but also assumes uniform distribution of air around the firing tube and controls the rotation of the flame; a condition essential for maximum combustion efficiency.

Forced draft blower is ruggedly built—easily accessible. Direct drive and low speed ball-bearing motor assure long, trouble-free service.

This efficient fan combined with adequate, smooth flue gas and air passages provides ample reserve capacity to operate the boiler against outlet pressure with minimum power consumption.



preheating of heavy oil is automatically controlled

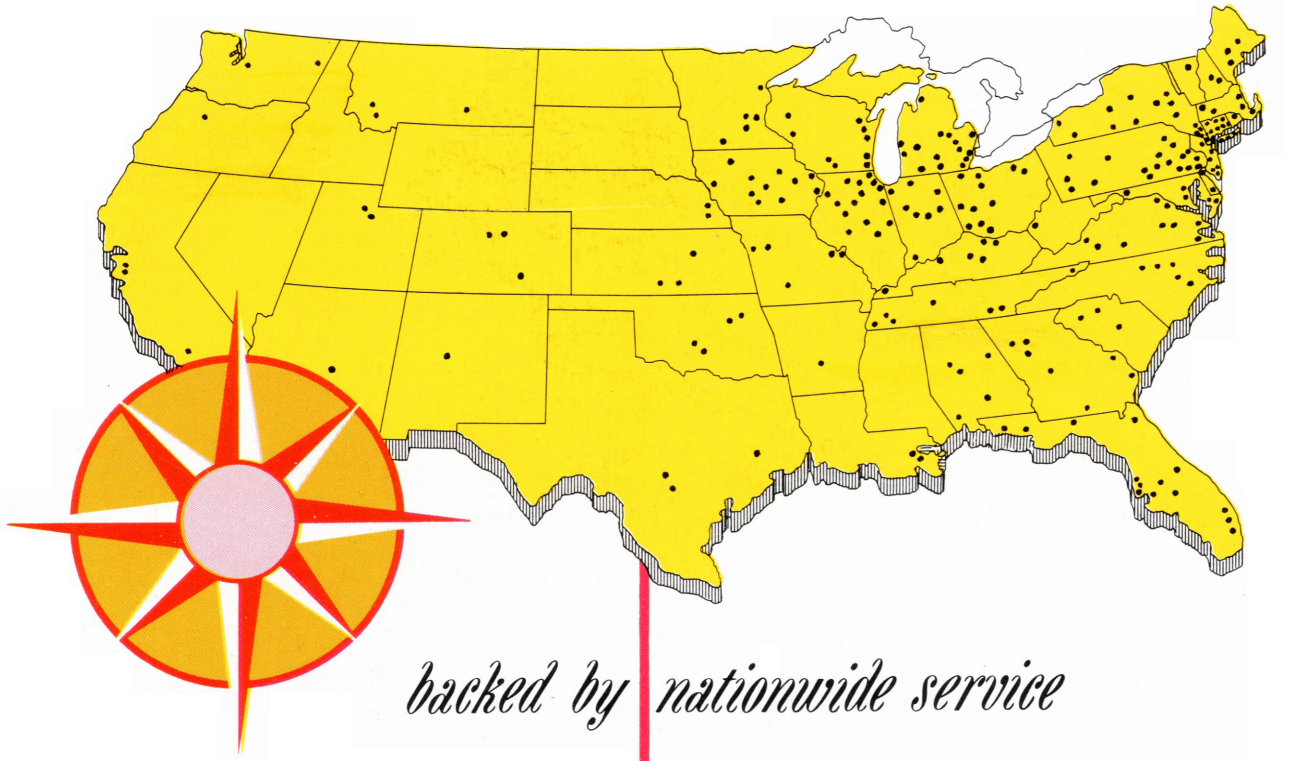
A completely equipped, fully automatic fuel oil heating system assures peak burner performance. Oil is kept automatically at just the right temperature for proper atomization.

Steam type heaters are regulated by a sensitive, bulb type throttling control, which admits just the right amount of steam to the heater to maintain the desired oil temperature.

Hot water type heat exchangers are equipped with oil temperature controls which operate a hot water circulating pump to maintain the required oil temperature.

In addition, each heavy oil burner is equipped with a thermostatically controlled electric heater in the oil line to the atomizing cup. This auxiliary heater assures that the oil reaches the cup at the proper temperature, even if the line heater has not been in operation long enough to heat the oil thoroughly. A thermostat prevents the burner from firing until the oil has reached the proper temperature.

When specified, all oil heaters and their associated controls, valves, strainers and gages will be completely piped and tested at the factory.



backed by nationwide service

The one irreplaceable thing about any product is the name and reputation of the maker . . . for this is the *real guarantee of worth.* With the Kewanee-Petro Boiler-Burner Unit, not one, but two makers . . . each of long known ability . . . stand back of it.

Who makes it . . . who stands back of it . . . who will look after it? These are the real questions to consider.

The map above shows the nation-wide spread of the Kewanee and Petro organizations . . . actually covering the country. This fact, plus the long standing reputation of two great companies, insures that the Kewanee-Petro Unit will never be an "orphan" and that whenever service is needed, it will be quickly available.

Boilermakers Since 1868

KEWANEE—PETRO

BOILER-BURNER UNIT

Over 50 Years of Leadership

Catalog 502 60M 2-54 GL

Litho in U.S.A.